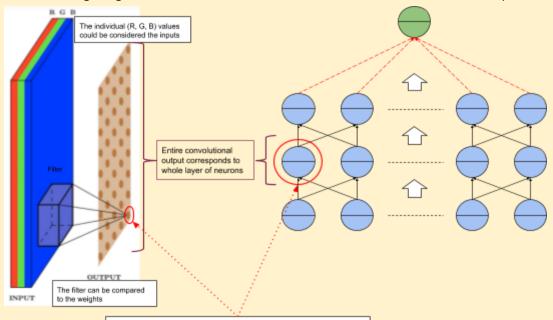
PadhAl: From Convolution Operation to Neural Network

One Fourth Labs

The convolution operation and Neural Networks Part 1

What is the relation between the convolution operation and neural networks?

1. The following diagram illustrates the similarities between the convolutional operation and DNNs



Calculating the convolutional output can be compared to the input calculation to the highlighted neuron.

- For the neuron, we consider all the input values from the previous layer multiplied by the weights,
- For the convolutional output, we only consider a small neighborhood of input values multiplied by the filter values
- 2. As we can see from the diagram, both the highlighted output neuron and the highlighted convolutional output are essentially weighted sums of the inputs provided to them
- 3. Let's look at a direct comparison

	Neural Network	Convolution Operation on image
Input	Numerical input values.	The RGB values for each pixel in the image
Output	Neuron which takes weighted sum of inputs as its input	Pixel which takes the RGB values transformed with a filter
Neighborhood	All inputs from the previous layer contribute to the output calculation	Only a localised neighborhood of inputs is considered for each output pixel.
	The entire convoluted output image corresponds to a whole layer of neurons	

The entire convoluted output image corresponds to a whole layer of neurons. With multiple filters, multiple convoluted outputs each correspond to separate layers of neurons